SUPPLEMENT.

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FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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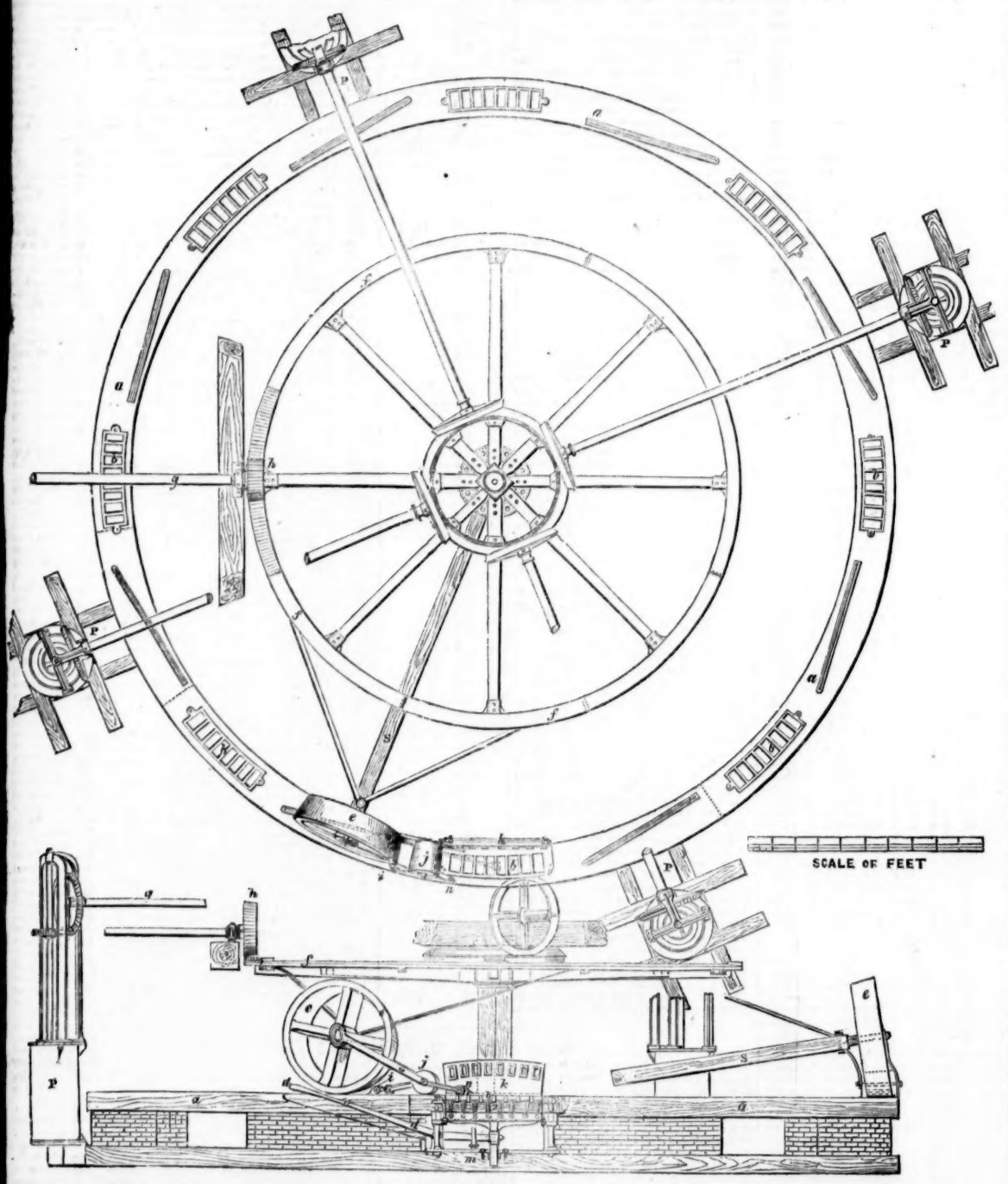
ROBERTS'S BRICK-MAKING MACHINE.



At the recent meeting of the Royal Cornwall Polytechnic Society, there was exhibited some portions of a new brick-making machine, the invention of Mr. John Roberts, builder, of Falmouth. These excited considerable attention, and a committee of gentlemen was appointed to examine the machine itself in operation, and to report to the council of the society on its merits. This report has not yet been published, but we understand that the opinion of the gentlemen is one of the most unqualified approbation. This machine possesses the qualities of simplicity and efficiency in a remarkable degree. There is scarcely any limit to the number of bricks which can be made by regulating the size of the machine, and the advantage of securing pressed bricks is obtained. The brick-making machines which have been usually employed require clays of fine quality, whereas the coarsest material can, if it is required, be made into bricks or tiles with great facility by the invention of Mr. Roberts.

The accompanying drawings will fully illustrate its principles and peculiarities:—The first figure shows the brick machine in plan, and the second in section, the references to each corresponding. A brief description will render the designs perfectly intelligible to our readers: *a a* is a circular track, on which are fixed a series of cast-iron moulds, *b b*, at regular intervals, the form of the moulds being according to the required shape of the bricks or tiles to be made; *e e* is a roller, which may vary in weight for 1 to 10 tons, as may be required; this moves round on the track, *a*, by steam, or any other power. This wheel, *e*, is connected with the beam, *s*, which is moved in the frame, *f*, by means of the shaft, *g*, and the cog-wheel, *h*. The clay or brick earth is filled into the moulds, and the roller, *e*, presses the same firmly into the moulds as it rolls over them. This wheel is immediately followed by a scraper, *i*, which removes any excess of clay or brick earth from the surface of the moulds, *j* being a smaller roller, which acts as a balance, to prevent the scraper from raising; *k* is a pressing plate, attached by hinges to the moulds, and upon this plate any design can be cast or engraved. This plate is turned down upon the clay in the moulds, and the wheel, *e*, passes over it a second time. All the moulds have movable bottoms, which, as are shown in section, are attached to a bar, and these are moved by the lever, *d*. As the wheel passes over the plate the second time, it presses down this lever, and thus raises the manufactured bricks from the moulds. The whole of the pistons and bar, *c*, are kept up by the stop, *b*, which works by a spring, and is removed by the treadle, *m*, as soon as the bricks or tiles are taken away: *n*, are small rollers fixed to the frame, *o*, to which the scraper is attached. It will be seen that, upon the circle, as represented in our drawing, there are eight sets of brick moulds, each set holding eight bricks, so that at each revolution of the wheel 64 bricks are formed. *p p p p*, are pugging machines, placed between each pair of moulds, and worked by shafts, as shown in the drawings.

Bricks of any pattern can be manufactured, and any design can be readily impressed upon them. Encaustic tiles, or tesseræ, can be, by means of very slight modifications, made as readily as bricks.

It is pleasing to find such a society as the Royal Cornwall Polytechnic Society directing its attention to such objects of general utility as that which we have now described. This brick-making machine, and the tin-dressing machines, which, this year, received the society's rewards and recommendations, are interesting examples of the inventive ingenuity which is constantly at work in Cornwall.

Iron Metallurgy.—Mr. S. B. Rogers, of Nant-y-Glo, Monmouthshire, has in the press, for publication in December, a Treatise on Iron Metallurgy, illustrated by steel plates, with suggestions for many essential improvements in the manufacture of iron, and a more perfect system of conducting extensive iron-works. A series of elaborate analytical tables connected with iron-making materials will be added to the work, the importance of which can hardly be over-estimated at this time, from the high scientific acquirements and great practical experience of the author. To be published at the *Mining Journal* office, price 35s.; to subscribers, whose names will be received at our office, 30s.

MANUFACTURE OF SALTPETRE.

A Parisian soap manufacturer, Mr. George Lürig, has recently patented some improvements in the manufacture of artificial saltpetre which appear calculated to cheapen the cost of production considerably. The invention consists in manufacturing saltpetre by treating, in the manner subsequently described, the common potash of commerce (carbonate of potash); sulphate of potash; nitrate of soda; and quick lime.

The proportions of the above materials used in this processs are as follows: 60 lbs. carbonate of potash, 40 lbs. sulphate of potash, 140 lbs. nitrate of soda, 180 lbs. quick lime. These quantities of carbonate and of sulphate of potash and of nitrate of soda are placed together in a large boiling pan or kettle, with enough water to dissolve them, heat being applied. When the liquor after boiling for some time comes to mark 20° on Beaumé's salt-areometer the fire is stopped, and the 180 lbs. of quick lime above mentioned, being placed in a tub large enough for that purpose, the solution is poured from the boiling pan on the quick lime, which is dissolved by it. As soon as this result has been attained the mixture is stirred for a few minutes, in order to get the compounds perfectly mixed together. After allowing it to settle for three or four hours, the lime gathers to the bottom, the superincumbent liquor is drawn off into a boiling pan of suitable dimensions prepared for that purpose; but as all the alkaline salts cannot be taken up from the lime by a first drawing, a fresh quantity of water is poured into the boiling pan or kettle, and the same operation is repeated as at first, the liquor being stirred up again and left to settle, it is then drawn off as before, and this second is mixed in the boiling pan with the first. The fire is then kindled under the boiling pan or kettle containing the above drawn off liquors, which are boiled down till they mark 25° of Beaumé's areometer. When the solution or lye thus prepared has attained this degree of concentration, it may be used for making hard soap of any kind, and it is only after the alkalies have been separated that the saltpetre is manufactured. Thus, for manufacturing the soap, the sediment in the boiling pan is taken out, whilst for manufacturing saltpetre the liquor is drawn off and carried in another boiling pan, where it is boiled down till it marks 33° on Beaumé's areometer; the liquor is then left to stand until it is lukewarm, and it is run out into a tub prepared for its reception, where it is left at rest for 24 hours. At the end of that time the mother liquor is drawn off from the crystals produced, by means of a cock or otherwise, and all the crystals deposited over the sides and bottom are saltpetre; the mother liquid, however, contains some saltpetre still, but as it is not strong enough to yield it by crystallisation, it should be concentrated anew; it is accordingly poured out again into the kettle or pan and boiled down till it marks 33°, when the same process as before described is repeated. All the liquors which have been submitted to the above process may yield a residue of saltpetre.

Saltpetre may also be manufactured with the same materials as before stated, mixed together in the following proportions:—70 lbs. carbonate of potash, 40 lbs. sulphate of potash, 110 lbs. nitrate of soda, and 180 lbs. quick lime. Saltpetre is obtained by this process, following the same method as in the first instance; the liquor, should, however, be boiled down a longer time in order to concentrate it to 42° instead of 33° of Beaumé's areometer, as in the first process.

In order to obtain crystallised saltpetre by this method, as many drawings off as possible should be effected, that is to say, until the liquor concentrated to 42° fails in giving crystals by cooling; the remaining liquor is only a solution of potash, with which all kinds of soap can be manufactured, or from which refined potash (pearlash) can be obtained. All the alkalies, alkaline sulphates, and nitrates may be used in a similar manner for obtaining saltpetre by the methods described.

THE SLATE TRADE.—No. II.

In resuming my series of papers on the Slate Trade, I beg to make a few observations with reference to the remarks of "An Old Hand," and other correspondents who have addressed you respecting my former paper. "An Old Hand" states that important slate quarries have been opened in America, Germany, France, and Switzerland; and Mr. Evan Hopkins also contends that slate quarries are found in Prussia; but as "An Old Hand" facetiously observes that many of the proprietors of these quarries know of their existence *to their own cost*, I am the more confirmed in the opinion I expressed in my former paper, "that the character and cleavage of the slate rock found in North Wales is superior to any at present discovered." Indeed, it is a notorious fact that the North Wales slate is unequalled, and though the strata denominated killas, which is found in the countries above mentioned, has a cleavage, and can be split into roofing slates, and also planed into slabs, as in the case in Switzerland; yet the inferiority of such rock to that produced in North Wales, as respects cleavage, durability, and uniformity of colour, is universally acknowledged. Hence it is that large quantities of slate are annually exported to the Baltic from North Wales, and extensively used in Prussia and other neighbouring countries. The Carnarvonshire and Merionethshire range of quarries may be justly considered as producing an article with which no other country in the world can bear comparison, and though other parts of the British Isles, and even foreign countries, can produce an article which is denominated slate, yet it is inferior in quality to that produced in North Wales, and can only command a market in the immediate neighbourhood in which it is found.

Again, "An Old Hand" says there are more than two large veins of slate in the respective districts of Bangor and Festiniog, which only await development by capitalists of ample means. I have no doubt, and geologists have asserted the fact, that there are numerous beds or veins of slate in North Wales, and that many capitalists, even the Rothschilds, know this *to their cost*. What I maintain is that the principal quarries in North Wales are all situated on two leading veins, but it is also a well-known fact that even in the immediate neighbourhood of our most productive quarries there are defects or "posts" in these veins, which render it impossible for them to be profitably worked. The Welsh Slate Company, for instance, have opened their quarry on a very promising part of the vein, and are now making a profit, which may be safely estimated at 25,000*l.* per annum; yet in the immediate vicinage of this quarry are found others, upon which large sums have been expended, and, from the nature of the rock, cannot be said to be working to produce profits. Your correspondent, "An Old Hand," also asserts, to corroborate his statement, "that at Gorsedda there is a quarry opened, the vein of which is equal, if not considerably exceeding, in breadth the one near Bangor, and distinguished from the same in metal and colour, being of a light blue, and promising extraordinary durability." It is quite true that a more favourable site for opening a quarry cannot be found than at Gorsedda, and I sincerely hope the "private proprietary" will not find *to their cost* that the

metal is not of the extraordinary durability represented, but that the colour and straightness of the same, when split, will command the ordinary price in the market. If "An Old Hand" will favour me with the average price at which the slates per ton have been sold, it will be a criterion as to the value of the rock at the upper floors. At a quarry not more than 10 miles distant, the average value of slates made is 49s. 6d. per ton, but this high price is owing to the depth at which the quarry is worked.

Another of your correspondents, O. Pritchard, agent of Rhiwbryfdir Quarry, states that poundage is allowed on 20s. value of slates, and not upon the standard price given for raising slates. I am greatly surprised to find an agent of such long standing as Mr. Pritchard assert this, as the manner in which "poundage" is paid is too well known to require contradiction. If the ordinary price for making 1280 princesses is 27s. 6d., an extra charge of 5s., 10s., and 20s. for poundage is made, and presuming it to be the latter, the price would be 55s.; but if poundage was charged on the value of the slates—viz., 187s. 6d. per 1260, as Mr. Pritchard asserts—it is very evident that slate-making would be a very remunerative business to the party who undertook the bargain. Again, Mr. Pritchard states that "the quarry proprietors have counterbalanced everything beyond dispute, and that a cubic foot of rock would not be left if the clearing would be of the least advantage." I am not prepared to admit the correctness of this statement, and if Mr. Pritchard will tax his arithmetical powers, and calculate the cost of removing the top at a certain angle, and to a required depth, and contrast this cost with the number of tons of slate which might be made out of the 50 ft. of solid slate rock left as a support, he will then see the advantage, or otherwise, of this step.

In my next, I will advert to the other important points connected with working quarries, cost of transit, royalty, &c.

BESSEMER'S MALLEABLE IRON.

Mr. J. G. Miners, manager of the American Magnetic Iron Company, New York, in a lengthened communication to the *Scientific American*, responds to an appeal for his opinion on this invention, in terms which appear conclusive as to the error in the theory upon which Mr. Bessemer's process is founded, so far as regards the production of *malleable* iron, although it must not be assumed that we express the same opinion with regard to *refined pig*. We allude merely to Mr. Bessemer's assertion, that the chemical changes which take place are such as to enable the operator to produce at pleasure "fine steel or masses of malleable iron, perfectly free from any admixture of cinder, oxide, or other extraneous matters," equal in quality to charcoal iron.

Mr. Bessemer may admire the production of chemically pure iron, but that is not the article which those who are practically acquainted with the manufacture of iron and steel wish to produce; and a brief examination only of the chemical composition of a few varieties of iron and steel, will be sufficient to ascertain whether Mr. Bessemer's proposition, that the nearer absolute purity we approach in the production of iron, the more useful qualities that iron will be possessed of, is correct. The following table represents the chemical structure of several kinds of iron and steel:—

	English grey cast.	English refined.	Danemora Swedish.	German.	English com. steel.	Eng. best razor steel.
Iron	94·63	98·90	98·78	99·87	97·94	93·80
Carbon	2·60	·41	·84	·09	1·72	1·43
Sulphur	·35	...	...	trace	...	1·00
Phosphorus	·39	·40	...	...	...	...
Silicon	1·53	·08	·02	·03	·22	·52
Arsenic	...	...	·02	...	·06	·93
Antimony	...	...	...	...	...	·12
Manganese	·50	·04	·05	...	·02	1·92
Copper	...	...	·07	...	...	...
Nitrogen	...	...	...	...	...	·18

From this it will be seen that English crude iron approaches nearer to metallic purity than the best English razor steel, and the Swedish possessing less purity than English refined iron, is yet capable of sustaining over 72,000 lbs. to the square inch, while the latter breaks at about 55,000 lbs.; and the German iron, which is the nearest approach to absolute purity, although possessing fibre, is so soft and weak as to be of less value than either. Mr. Miner remarks, that Mr. Bessemer congratulates himself upon the excessively elevated temperature that he obtains in the latter part of his operation, or after the entire consumption of the contained carbon—in plain terms, by oxidising or burning the iron. This oxide, we are told, from the elevated temperature that the metal has acquired as soon as formed, undergoes fusion, and forms a powerful solvent of those earthy bases which are associated with the iron. Mr. Miner is at a loss to comprehend how this is effected, having heretofore supposed that the melting of such an oxide could not be effected at any temperature in an oxidising flame—which Mr. Bessemer's clearly is. Again, the lower the temperature at which crude iron is worked, the better will be the quality of the wrought iron produced. Good bar or wrought iron is always fibrous, and loses its fibres neither by heat nor cold. Fine malleability and fibrous structure can only be given to iron by a tough cinder and manipulation. Mr. Miner is of opinion that any improvement in the iron, after it has been submitted to Mr. Bessemer's process, would be extremely difficult.

MANUFACTURE OF MALLEABLE IRON DIRECT FROM THE ORE.

The excitement caused by the Bessemer process, by which we were to have had malleable iron at the price of pig-iron, has now nearly subsided, and, unfortunately for Mr. Bessemer, the public have discovered that there is little hope of his process being rendered available for manufacturing wrought-iron, and, in the opinion of many, the claiming of the process as his invention has done more to brand him as a plagiarist than any of his many inventions previously patented. The Dowlais Iron Company appear to have thoroughly and impartially tested Mr. Bessemer's process, and the results obtained can only be regarded as a total failure. Some weeks since a few ingots of the "prepared metal" were sent down from Baxter House, and rolled at Dowlais into "East Indian" rails, and were, apparently, free from defects and flaws, undergoing a test of 12 tons pressure in the deflecting machine, equal to, or even better than, rails of heavier pattern from ordinary South Wales iron; this "prepared metal" was produced in this instance from Blaenavon pig-iron made from the native clay ironstone. Since this experiment, other similar ingots have been rolled with totally different results, attributable probably to the "prepared metal" being manufactured from a different quality of pig-iron. The rails in this instance were of the "Great Western Bridge Section;" two appeared perfect, three were slightly defective, requiring patching, and six "wasters." Even the two perfect ones had a very frangible appearance—approaching very nearly to that of "red short" iron.

A Bessemer furnace has since been erected, and acted excellently so far as the process was concerned, but failed to produce anything like malleable iron. The iron used was from clay ironstone, Whitehaven hematite, and small portions of forge cinders, in the proportions usually employed in Wales for rails and merchant iron. The trials by the Dowlais men proved a complete failure, but they could scarcely be considered a fair test. In a few days, however, Mr. Bessemer arrived, and another trial was commenced; after it had been subjected to a blast of 8 lbs. pressure it was withdrawn and taken to the "squeezer," as is usual with puddled blooms, to take out the dross and unite the particles of metal. Instead of acting like puddled iron, Mr. Bessemer's bloom, under the "squeezer," was a mere mass of red-hot friable matter, and from its crumbling, and non-cohesion, was, with difficulty, formed into an ingot: when passed through the rolls it broke on the drawing side as easily as very "red short" iron, to the infinite gratification of the men, who greeted each failure with hearty cheers. By mixing slag with the metal, he was enabled to make a slight improvement; but, on being submitted to a similar manipulation, it was found to be no better than "cold short" iron. It appears, therefore, that the opinions already expressed in the *Mining Journal*, that the process is only applicable to refining pig-iron, and that it must then be continued for a limited period only, are substantially correct.

The total failure of Mr. Bessemer's process does not appear to have discouraged inventors from endeavouring to manufacture malleable iron direct from the ore; and in the last *Scientific American*, the invention of Mr. M. S. Salter, of Newark, U.S., is described, which, however, appears more calculated to answer in theory than practice. It consists of three chambers, arranged one above the other, and in such a manner that the heat from the furnace, which is at the extremity of the lower chamber, shall pass through the entire length of each, previously to escaping by the chimney.

The ores, with the necessary materials for their reduction, are introduced into the upper chamber, through an opening in the roof; they are first suspended in a hopper-shaped receptacle, which is provided with slide valve or shutter. The ores at then, at suitable intervals of time, removed to the draft opening, through which they are thrown down to the middle chamber; they are next thrown down openings into the lower chamber; next they are removed along the lower chamber to the finishing basin near the fire, where the effects of the heat are completed, and whence they are taken out, in the metallic state, ready for the hammer.

Through the sides of all the chambers, openings are made through which the ores and materials may be frequently agitated by suitable instruments, and moved along from one end of the several chambers to the other, and finally through, the metal may be moulded and taken out from the furnace.

There are also openings for the blast, for the fuel, and for letting off any liquid matters which may accumulate in the finishing furnace. Through the floor of the lower chamber there is an opening in the end opposite the fire through which may fall the cinders and ashes, and other solid materials carried along thither by the draft. For the same purpose other suitable receptacles are provided in the other chambers.

To prevent any undue accumulation of heat in the middle or upper chambers, or to prevent the introduction to said chambers of cold air, or air charged with oxygen coming through openings in the lower chamber, flues are made to lead from the lower chamber upwards, directly through the top of the furnace. These flues are ordinarily kept closed by dampers, and when they are opened, the draft is prevented from pursuing its ordinary passage by a damper on the top of the chimney.

To prevent the too violent effects of the heat, openings are made in sides and ends of the furnace, for the introduction of cold air between the roofs and floors of the chambers. The floors of the several chambers may be either horizontal or inclined.

The lower chamber is raised up from the ground for the convenience of working, for the easy flowing away of liquid impurities, and for the falling down of ashes and cinders. This process is alleged to afford these advantages:—

The gradual heating of the ores, with the necessary materials for their reduction as they are moved nearer to the fire from chamber to chamber, and from one end of a chamber to the other.

Opportunity is afforded for the frequent agitation of the ores and materials, by which agitation the impurities are freely allowed to escape, the materials are properly mixed, and become, in turn, equally exposed to the heat and to the draft.

The draft is unconfined, and moves freely and rapidly for carrying off the impurities.

The atmospheric air is deprived for the most part of its oxygen by the fuel of the fireplace, and, therefore, while passing rapidly through the ores, it does not oxidise the metal, and does not consume the carbon, which is consequently allowed freely to extract the oxygen from the ores. By the gradual heating and freedom of draft and frequent agitation, an opportunity is afforded for the free escape of impurities in their natural order, beginning with the more volatile, and ending with the more fixed. Such escape of gaseous products is more difficult while a mass of solid materials from which they are generated remains at rest.

The agitation may be carried on at different temperatures, so that the objects which it cannot effect at one degree of heat it will at another. This is the purpose of the three several chambers, of which the upper is the heating and vaporising, the middle the mixing, and the lower the reducing and finishing chamber.

It is alleged that the ores can be reduced to metals of more than ordinary purity by the above-mentioned means. The ores of iron may be reduced to wrought or malleable iron without first carbonising the iron. They may be reduced also to a carbonised state, either as steel or as cast or pig-iron; this may be done by having less agitation and adding an excess of carbon.

The necessary materials for the reduction of the ores may be introduced at different temperatures, and at different stages of reduction, according as their presence may be needed. For example, when lime is required for separating silica from iron ore, such lime need not be introduced at the beginning of the process, when the temperature is low, for at such temperature it cannot act upon the silica, and its presence would certainly interfere with the free expulsion of other impurities. It may, therefore, be introduced partly in the middle, and partly in the lower chamber, as needed.

The carbonic acid gas evolved from the limestone or shells introduced in the lower chamber tends to protect the carbon and ores and impurities from the residuum of free oxygen left in the draft.

It is claimed that this process yields a greater percentage of metal from any given amount of ore than is obtained by other furnaces heretofore used. The ores and the necessary materials for the reduction are, through the whole process, completely under control, subject to such various treatment as they may require at different stages of reduction, and opportunities are afforded for the escape of impurities without their combining with, and carrying off, the metals.

Another advantage claimed is that ores may be reduced by the use of anthracite coal alone, both as fuel and as the deoxidising agent, the impurities of that coal (such as sulphur) are expelled at a low temperature, before such coal acts on the ore, and, consequently, before the metals still in the ore can be affected by such impurities.

It is also alleged that there is a saving of coal to a large amount, both as fuel and as a deoxidising agent; this is effected as a deoxidising agent, because no more coal is used than is necessary to extract the oxygen from the ores, none entering into the iron, and also from the rapidity of the operation, very little being carried off by the draft. The saving of coal as fuel is effected partly by the various facilities already enumerated, for the expulsion of impurities, partly by the prevention of the escape of heat, one chamber being compacted upon another, and partly by the long continuous range of the draft, to the whole force of which the ores are exposed by their position, agitation, and falling. Owing to the freedom of draft, there is no mechanical pressure by said draft upon the ores, therefore it cannot, by the force of such pressure, prevent the chemical decomposition of the ores, nor carry away the pulverised particles of ores and carbon.

We are informed that this process has been thoroughly tested, and found to succeed far beyond expectation.

It is alleged to be so cheap and expeditious as to render the expense of producing malleable iron of the best quality less than that pig-iron made in the common blast-furnaces. If this be so, it certainly is a remarkable invention, and will give a wonderful impetus to manufacturing and industrial industry.

Rails of Railways.—Mr. Charles Fred. Stansbury, of London, has provisionally specified an invention (a communication), which consists in securing the joints of the rails to the permanent way by the employment of splice pieces or beams of wood securely attached on one or both sides of the rails, such wooden splice pieces being long enough to extend lengthwise along the rail, so as to cover three or more sills, and wide enough to have a firm bearing upon them, and to be securely fastened thereto, the height of the outer splice piece being limited only by the height of the rail, it being only necessary that the tread of passing wheels shall not come in contact with its upper surface, and the height of the inside piece being determined by the height of the rail and the size of the flanges of the wheels, both said splice pieces being of sufficient strength to bear the heaviest loads without sensible, vertical, or lateral deflection. Take a piece of strong, hard, well-seasoned wood of 6 in. to 8 inch in width, and of the same height as the rail, less one-eighth of an inch, to avoid contact with the tread of passing wheels, and dress this on the side which is to lay next to the rails, so that the section of the wood will nearly correspond with a section of the rail, leaving the wooden section scant in the middle, so as not to touch the middle of the waist of the rail, in order that the wood at the top and bottom curves of the rail may be brought into firm contact therewith when the bolts are screwed up. The length of this piece is such as to extend over three or more of the sills or supports, the centre sill being that upon which the ends of the rails rest. The rails having been punched or drilled with two or three holes at each end, make corresponding holes in the splice pieces, through which pass bolts with washers under their heads on the inside of the rail, the under surface of the washers corresponding with the curve of the rail, and the washer at the joint being of a length to serve the two end bolts, and help tie the ends of the rails. The washers under the nuts, on the outside of the wooden splice piece, are made of cast-iron, and about 1 in. thick in the middle, tapering to the circumference, and at least 4 in. in diameter. The bolts are made three-fourths of an inch in diameter; strong spikes are driven through holes bored in the splice pieces into the sills or supports, and complete the construction. To the inside of the rails, fit in like manner, as above described, another splice timber of corresponding size, which is also secured to the cross ties. The bolts in that case are made in the form of a double staple, and with the staple part on the inside, and the bolts passing entirely through, with large washers under the nuts on the outside of the outer splice piece. The upper surface of this inner splice is cut down obliquely to permit the wheel flanges to pass freely. By these means the rails will be embraced between the two wooden splice pieces, which are in turn fastened to three or more cross ties.

Strengthening and Preserving Wood and Timber.—Mr. W. Billinton, of Great George-street, Westminster, has patented an improved method of treating straight pieces or baulks of wood or timber, for the purpose of rendering the same stronger and more durable than heretofore, which consists in exerting mechanical pressure endwise of the grain or fibres of the wood or timber, either when the same is green or dry, as in practise may be found most desirable; the intention for thus operating upon the wood or timber being to compress, strengthen, and consolidate the fibres or grain thereof, so as to render the wood or timber impermeable, and not subject to decay, and by thus operating upon it, to season the same by artificial means in a short space of time, and in a considerably more efficient manner than the natural means hitherto adopted for seasoning wood or timber.

Ventilation of Collieries.—At the Institution of Mechanical Engineers, Birmingham, Mr. Ebenezer Rogers, of Abercarn, read a paper descriptive of the Ventilating Fan at Abercarn Colliery. This is a simple construction of revolving fan, employed for ventilating a coal pit by mechanical means, instead of the ordinary mode of furnace ventilation. The fan is placed alongside the top of the pit, and is of large size, running at a comparatively slow speed; it is formed of eight vanes, fixed on a horizontal shaft, on the end of which is a crank driven by a small direct-acting steam-engine. The fan has an iron casing, formed of two sides only, between which it revolves, and the air is drawn in from the pit at the centre of the fan through an aperture in each side, and is expelled at the circumference, which is left open all round. The top of the upcast-shaft is closed by an air-valve, formed by simply boarding up the ordinary guard or cover placed over the mouth of the pit; and when a waggon of coal arrives at the top, the air-valve is carried up by the cage containing the waggon, and is lowered again when the cage descends, the mouth of the pit being closed in the interim by the bottom of the cage. The plan of ventilating mines in this manner, by employing large exhausting fans moving at a slow speed, is the invention of Mr. James Nasmyth, of Patricroft by whom the present fan was designed and constructed. The important features in this method are, the large diameter of the fan, by which a large quantity of air is passed through the mine without requiring a high velocity of rotation, in consequence of which the fan can be driven direct by the engine with no intermediate gearing; the casing of the fan also, being left entirely open at the circumference, allows the discharged air to fly off freely, causing a saving of power in consequence; and the fan is entirely exposed to view, so that its action and rate can be seen at all times, the source of ventilation being thus kept under complete control; whilst the situation of the machine on the surface of the ground prevents risk of injury to it in case of an explosion or other accident in the pit. By the use of the fan a great saving of fuel is effected, compared with the ordinary system of furnace ventilation, in which fires are kept burning at the bottom of the upcast shaft, producing a draught up the shaft, by which the mine is ventilated. The fan ventilation has the advantage that the upcast shaft can be used for working equally with the downcast shaft, being cool and free from smoke; and in the case of a bratticed shaft the timber is not not exposed to the injurous action of the heated air. This ventilating fan has been at work for two years, and in constant use day and night; and has maintained the ventilation of the mine, which is of a very fiery character, with complete satisfaction, without any difficulty or check having occurred; and it has been found to have an important advantage in the complete command over the ventilation, which can be suddenly increased in any emergency by simply turning on more steam to the engine, causing the fan to work at an increased speed. It was mentioned that a second fan of the same description, but of larger size, had been subsequently erected by Mr. Nasmyth, at Sklar Spring Colliery, near Elsecar, which had also proved quite satisfactory. A remarkable instance was mentioned in the paper, showing the great value of the fan in affording a means of suddenly increasing the current of ventilation in the mine, which is quite impracticable with the ordinary mode of furnace ventilation.

STANNARIES OF CORNWALL AND DEVON.

At the quarterly sittings of the Court of Stannaries, before His Honour the Vice-Warden, Mr. Edward Smirke, just held at Truro, the following causes in equity were the only proceedings of any public interest:—

St. Dennis Consols.—There had been several creditors' suits against this company in the Stannaries' Court, and Mr. Stokes was about to obtain decrees for sale of the machinery, on behalf of three creditors, whose claims were to a considerable amount. Subsequently to this, a petition was presented to the Court of Chancery by three of the shareholders of the company, under the Joint-Stock Companies Act, 1856, the first section of which enacts "That on petition to wind-up being presented to the Court of Chancery, and notice thereof being given to the Vice-Warden, Registrar, and officers thereunder, they shall cease from entertaining and dealing with any case touching such mine, except as directed by the Court of Chancery." The petition must be presented by shareholders holding one-tenth of the shares. Mr. Stokes said notice had been served on the part of the Court of Chancery, and the question was whether that notice determined the further progress of the proceedings in the Court of Stannaries, as, if so, the creditors of the mine would be greatly prejudiced. He referred to clauses of the Joint-Stock Companies Act, 1856, and also to 12th and 13th Vict., which gives power to the court above, under the Winding-up Act, to refer cases to the Court of Stannaries. Mr. Stokes asked the Vice-Warden to assist him, in such way as he might think fit, for the sake of the public, either by communicating with the Court of Chancery, or otherwise, so as to get the sale of machinery and proof of debts carried out by the officers of this Court. The Vice-Warden expressed his readiness to assist, so far as he might be able to do so.

Hamilton *v.* Williams.—This was a suit in equity, instituted on the part of Mr. Thomas Hamilton, of Truro, to recover 59*l.* 15s. from the defendant, Mr. John Williams, of Truro; the petitioner also praying that the defendant might be decreed to take back ten 1024th shares in Victoria Mine, in the parish of St. Agnes, of which mine the defendant was formerly the managing captain. The question between the parties depended upon the construction of an agreement entered into on Dec. 13, 1854, when defendant was very sanguine about the mine, and being anxious that new shareholders should come in, he offered favourable conditions to one or two parties—viz., to guarantee them against loss, if within a certain period they would allow him to take up the dividends. He offered plaintiff shares on these conditions, and the following written agreement was entered into between them:—"That in consideration of T. Hamilton taking ten 500th shares in Victoria Mine, in St. Agnes, J. Williams engages to guarantee, and hold T. Hamilton safe from all loss, for a period of twelve months after commencement of operations in the said mine by a steam-engine, at the expiration of which time it shall be optional to T. Hamilton to carry out the adventure at his own risk, or receive back his full amount of outlay from John Williams. And T. Hamilton engages, in consideration of his being so saved from risk or loss, to allow John Williams to take up for his own benefit whatever profits, in the shape of dividends on the said shares, that may accrue from Victoria Mine, within the space above-mentioned." The mine proved a losing concern, and calls were made upon the plaintiff, which with the purchase money of the ten shares paid in Dec., 1854, amounted altogether in July, 1856, to 59*l.* 15s., the amount plaintiff now sought to recover. The engine went to work on May 1, 1855, so that the twelve months named in the agreement expired on May 1, 1856; but another agreement was then entered into between the parties, by which the time was prolonged to July 1, 1856. The dispute now between the parties was with regard to the meaning of the agreement drawn in Dec., 1854. The plaintiff's view was that defendant had thereby guaranteed him not only from loss during twelve months after the engine went to work, but from all loss from the date of the agreement, Dec. 13, 1854, together with the purchase money he then paid for the shares. On the other hand, it was contended on the part of defendant that he was only liable for twelve months from the time the engine went to work, and not for antecedent costs or purchase money. A great deal of evidence of a conflicting character was given in the case, and the Vice-Warden reserved judgment.

Cheston and another *v.* T. Richards and Another.—The plaintiffs were Mr. Cheston Cheston, solicitor, of London, and Mr. Joseph Youngman, of London; and the defendants were Capt. Thomas Richards, of Hayle, and the Rev. Hender Molesworth St. Aubyn, of Clowance. The proceedings in this case were very voluminous, and occupied the court four days. Mr. Roberts and Mr. Chilcott conducted plaintiff's case; Mr. Hockin and Mr. F. V. Hill appeared for defendant, Mr. St. Aubyn, and Mr. Stokes and Mr. Davies for defendant Richards. From the documentary and oral evidence, it appeared that the suit was instituted on behalf of the shareholders in Clowance Wood Mine, of which company Mr. Cardozo was the secretary in London, and his son, Mr. W. P. Cardozo, the purser of the mine in Cornwall. The defendant, Mr. St. Aubyn, was the lord of the sett, and also of an adjoining sett, called Wheal Treasury. Clowance Wood sett was granted on June 1, 1852. Wheal Treasury was worked by another company, with a large engine, which drained Clowance Wood Mine; but Wheal Treasury proving unfortunate, that engine ceased working in 1854, and by Sept., 1854, the water had risen to adit in Clowance Wood. After this, from Sept., 1854, to the beginning of June, 1855, there were only two or three men working on the average in Clowance Wood Mine; but on June 12, 1855, six men were set to work to sink a shaft. Previously to this, however, the sett had been revoked by the lord. On May 11, notice of revocation was received by Mr. Cardozo, in London, who wrote to Mr. St. Aubyn on the subject, stating that the company had expended 3000*l.* on the mine, and were making discoveries. Mr. St. Aubyn replied that he had signed the revocation by advice of his steward, Mr. Grylls, and his tollor, Capt. Mark Reed, with whom he requested Mr. Cardozo to communicate, and said he had been informed that the mine had never been worked properly. From other evidence, it appeared that Captain T. Richards had applied for the sett, and on April 21, 1855, had issued circulars inviting parties to take shares, stating that he had purchased Wheal Treasury 80-in. engine, and obtained an extension of that sett eastward (including Clowance Wood). Another point of evidence was, that Capt. Richards made the last setting before the revocation of the sett—on April 7, 1855, and that this setting extended to May 4, the revocation having taken place on May 1. On these, which were the main features of the case, it was submitted, on the part of plaintiffs, that the revocation of the sett was invalid, inasmuch as that act took place through the representations and applications of Capt. Richards, who was their managing agent in Clowance Wood, and had thus committed a breach of trust towards his employers; and that it being known to Mr. St. Aubyn that he was the agent of Clowance Wood, the lord was not justified in entertaining any such application on the part of Richards. Plaintiffs, therefore, prayed that the shares now held by Richards in Wheal Treasury and Clowance Wood (now worked under the name of Wheal Treasury United) should be decreed to be held in trust for the Clowance Wood Company, and that some shares Mr. St. Aubyn had taken (on the same terms as other shareholders) should be also decreed to be held in trust for the Clowance Wood Company, because Mr. St. Aubyn having taken those shares from Capt. Richards, inherited his defective title thereto. The deed of revocation set out that there had been a breach of covenant, because the adventurers had not, within 12 months from the date of the lease, erected and set to work a steam-engine, as was provided by the terms of the lease. Plaintiffs' advocates, however, submitted, on the authority of several cases, that the failure to erect the engine within 12 months did not justify the revocation of the sett, because more than 12 months after the date of the lease the lord had received dues, which amounted to a waiver of the covenant to put up the engine within 12 months. On the other hand, defendants' advocates called witnesses, and argued in support of the revocation. They alleged a continuing breach of the covenants from the sett being ineffectually worked, and that Capt. Richards (who had not been for some time a paid agent of the company, but attended to Clowance Wood Mine in conjunction with Capts. Chegwin and Delbridge, of South Crenver, worked by the same company as Clowance Wood) had resigned his position in connection with Clowance Wood before he negotiated for that sett, which he did because the sett was lying almost idle, the Clowance Wood Company being unable to raise funds to carry on the works effectually. Defendants' advocates contended that Mr. St. Aubyn and his agents had acted with perfect propriety in revoking the sett, and that Capt. Richards had acted in a *bona fide* manner in applying for the sett. The witnesses called for plaintiffs were Mr. Cardozo, who was under examination and cross-examination seven hours, Mr. W. P. Cardozo, and Captain John Delbridge. For defendants, the witnesses were Mr. Glynn Grylls, of Helston, steward of Mr. St. Aubyn, Captain Mark Reed, and the defendant, Captain Thomas Richards. The latter said that, previously to his obtaining the Clowance Wood sett, he had put himself in communication with the old adventurers, or the principal of them, offering them shares, and subsequently offered the entire mine, through Mr. Rawlings; that they did not take shares with him, and some of the principal of them had relinquished their shares in the old concern, while Mr. Cheston, who was the largest remaining shareholder, positively refused going on with the mine, and had written to him, declaring that he was no party to the present suit, and had not authorised the proceedings. After hearing the evidence and arguments, the Vice-Warden deferred judgment.

Noell *v.* Wynne.—This case originally came before the court in Feb., 1856: the plaintiff, Mr. Henry Noell, of Hayle, purser of Gwallon Mine, claiming from Mr. Thomas Wynne, of Longton, in Staffordshire, 213*l.* 0s. 8d., arrears of costs, the question at issue being whether defendant was a shareholder, he having applied for 25 shares, and being allotted a less number, 22. Judgment was given to plaintiff, subject to an issue at law, which also resulted in favour of plaintiff. Evidence was given at these sittings on the point whether Mr. Thomas Bettony, china manufacturer, Staffordshire, acted as an agent between plaintiff and defendant. The general question was also urged on the equity reserve, and the Vice-Warden said he would give judgment at an early day.

CORNISH STEAM-ENGINES.

The number of pumping engines reported by *Lean's Engine Reporter* for the month of October is 25. They have consumed 1411 tons of coal; and lifted 11,000,000 tons of water, 10 fms. high. The average duty of the whole is, therefore, 54,000,000 lbs. lifted 1 foot high, by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

Mines.	Engines.	Length of stroke in the cylinder.	Load in lbs.	Load per square inch on piston.	Strokes per minute.	Coals in cwts., 112 lbs.	Coals p. horse-power p. hour.	Mill. lifted 1ft. high by consuming 1 cwt. of coals, 112 lbs.
		ft.	lbs.			lbs.	lbs.	
Great Work	Leeds's 60 in.	9·0	53,688	14·7	7·4	1971	3·1	69·9
Wheal Tremayne	Michell's 60 in.	10·0	41,051	13·0	2·7	610	3·3	66·0
North Roskear	Doctor's 70 in.	10·0	68,380	14·2	5·4	1890	4·0	54·7
East Pool	60 in.	9·75	44,252	12·4	3·5	769	4·0	54·4
Sou. Wh. Frances	Marriott's 75 in.	11·0	79,618	14·7	2·3	880	3·3	66·7
Perran United	80 in.	9·8	65,332	13·0	5·1	2409	3·7	58·9
Perran St. George	60 and 100 in.	9·0	40,587	12·7	6·1	1292	3·3	66·8
East Wheal Rose	Michell's 85 in.	10·0	3,722 / 77,210	12·7	3·2	1850	3·9	56·0
East Wheal Rose	North, 70 in.	10·0	60,709	15·7	3·2	946	2·3	93·0

Engineers' Names.—Great Work, P. Roberts; Wheal Tremayne, J. Thomas; North Roskear, J. West; East Pool, J. West; South Wheal Frances, T. James; Perran St. George, Sims and Son; East Wheal Rose, Hocking and Loam.

Motive Power.—Mr. Herbelot, Paris, proposes to obtain motive power by employing compressed air, or other gas or gases, or a fluid, in the following manner:—The gas or fluid is introduced into an air-tight case, which contains a shaft or spindle, that has fixed thereto, or formed thereon, a helix or thread, or helices or threads, of uniform breadth and thickness. The gas or fluid, by exerting unbalanced pressures on abutments, formed either at the extremities of the helix or helices, or otherwise, communicates rotary motion to the shaft or spindle, and by means of it to an external shaft, by means of which machinery of any description may be driven.

Original Correspondence.

THE COLONIAL GOLD MINING COMPANY AND GOLD QUARTZ MINING.

SIR,—This company has now proved, what I have maintained for many years, that "gold quartz mining" cannot be wrought with profit by public companies. However, it is argued by many, that the failure of this company has been owing to the want of practical experience in gold mining, and the sending out to the colonies expensive and improper machinery. But, I maintain, that had the company the very best practical experience, and the most economical and effective machinery for crushing and extracting the gold, heavy losses would still have been inevitable, unless it permitted its local manager to act according to his own judgment, and allow him to move from place to place, like a digger, to select the scattered superficial patches of the paying gold quartz, and not to erect a *mining* establishment on a *fixed* spot. Such a mode of working is, however, totally inapplicable to public companies, and is only suitable to small companies of working miners. But if the shareholders insisted on carrying on quartz mining, it was, and still is, the only way by which it would be possible to make it pay. It is for this reason that the old experienced gold companies avoid gold quartz mining, and confine themselves to the working of auriferous pyrites veins, whose average product can be depended upon.

Prof. M'Coy, in his evidence before the committee of enquiry, at Melbourne, has evidently availed himself of the experience of the Spaniards, and the reports of the English agents in South America. Some of my letters and reports on the subject of gold quartz mining date as far back as 1834. My observations have not only been frequently used and unacknowledged by professors, but often placed to the credit of others, who only became acquainted with the sight of gold mining a few years ago.

Prof. M'Coy gave the following evidence as a caution to those about to enter into quartz mining operations in Victoria:—

"Experience has shown, in every part of the world, that where quartz reefs, or where the solid rock, whatever it may be composed of, has been mined for the extraction of gold, loss has ultimately occurred. It is found that in every part of the world the mining of gold in the solid rock has ultimately proved too expensive to pay for the time, labour, and cost by the quantity of gold extracted. I may mention, that along the Andes the Spanish miners have mined into the solid rock, under the full impression that as there was so much gold on the surface, they would be able, by the help of machinery and their mining skill and experience, by the combination of science and art, to extract it from the bowels of the earth. But the deeper they went the less they got, and they had, ultimately, to give up mining for gold. * * * * That was an experience that fully demonstrated that the further you go down into the earth the more gold decreases. The silver, copper, and lead mines repay you for sinking, but, on the contrary, the deeper you go the less gold you find. The theory is adopted now by nearly every practical geologist of Europe, and also of America. Therefore, all experience would make us rather hesitate in encouraging the mining for gold in the solid rock."

The above observations of Prof. M'Coy require qualifications. Mining for gold in "the solid rock" is still extensively carried on in America, by public and by private companies, and with profit; and some of the mines have levels driven, in porphyry and clay-slate rocks, upwards of 200 fms. in extent, and yet extract gold with profit. The Professor should confine his warning strictly to *solid quartz*, and should distinguish quartz veins and quartz reefs from auriferous *pyrites* veins in solid rocks.

The Columbian Mining Association tried the gold quartz mine of San Rita in 1838; this mine produced gold quartz specimens on the surface as rich as those found in California and Australia, yet the company lost about $30,000 during two years' working, notwithstanding it had the best and most economical extracting machinery erected there, and worked by water-wheels. Having had much experience in such matters, it would have been unpardonable on my part to have led the Port Phillip Company into such ruinous speculations. The Colonial Government offered me, soon after my arrival, as much quartz veins as I should wish to select; but I declined the offer, and gave my reason in evidence for so doing before the Executive council. Nevertheless, both the Colonial and the Port Phillip Gold Companies might have succeeded in establishing a very profitable business in the colonies had they proceeded with caution, and in accordance with the available resources and the wants of the country, and not merely for the sake of stock-jobbing purposes in London, and sacrificing the prospects of the legitimate shareholders by unsuitable appointments.

The Colonial Gold Company need not wind-up because it failed to make gold quartz mining a paying affair, it may take another and a more certain and remunerative business in the colonies, with much better prospects of permanent success. The Australian colonies appear to be changing for the better; they are much more adapted now for companies than they were a few years ago. All that is wanted is to select men of experience and integrity, send them out with full power to act according to their own judgment, faithfully support them, and not to misrepresent them at home. Van Diemens Land is worthy of attention at this moment. Every encouragement will be given to any company carried on in the usual legitimate manner; I hope, therefore, for the credit of the English nation, that one honest company at least, out of the number that started, will be permanently established there for the benefit of the shareholders, and to the advantage of the development of the resources of the colonies. EVAN HOPKINS.

Thurloe-square, Nov. 26.

AUSTRALIAN RAILWAYS.

SIR,—The last advices from the colonies acquaint us that in every department of commercial enterprise great activity prevailed. Railways and electric communications engrossed very general attention, especially in Victoria and Tasmania. These objects are considered essential and necessary to the general advance of the colony; while it is equally evident that England is looked to for the ways and means of accomplishing these undertakings. But how is this to be done? In your last you deprecated foreign enterprises, owing to the stock-jobbing tricks of the London managers—that they tamper with official statements, concoct reports, and make scape-goats of their agents, to cloak their own mismanagement. These proceedings of London companies having, then, obtained such a notoriety at home, and in the colonies, I ask, how can it be expected that the public will support any new colonial company, or that any respectable and efficient men will expatriate themselves as the local managers, at the risk of being made the mere instruments for stock-jobbing purposes? It may be said that railways, telegraphs, &c., are very different to mining speculations, and that they are not open to such gross abuses as those which have been set forth in your Journal; but they require a most energetic and efficient class of practical men, and not such men as are too frequently found at the head of mining concerns. It is true that a Chairman, or the managing secretary of a railway company, could not possibly remain long in office, if he were found guilty of attempting to convert the scheme into a private business, or to jeopardise the prospects of the undertaking by making private and inefficient appointments, and wilfully and obstinately persist in them, in spite of all remonstrances as to the consequences.

If the Colonial Government sanction a project, and grant a guarantee, it will exercise a due supervision, and would, doubtless, make such a grant null and void the moment it detected official abuses, be they committed at home or in the colony. But, unfortunately, before that takes place, the undertaking may fall into disgrace, a large amount of the capital be lost, and the shareholders, together with their faithful agents, defied from obtaining any redress, by a reckless body of directors, who might have contrived to render the shareholders helpless, as is done daily by London companies. Therefore, in Victoria, the Government has wisely resolved, for the present, to take the main trunk railway into its own hands, and will not grant in future great projects, with a guarantee to public companies, unless they give most ample security that such objects be undertaken by efficient staffs, which are not to be tampered with, and that the managing control be established in the colony, and not in London.

As these great projects must be supported and carried into effect by English capital and science, it is deemed more advisable to apply for the same through the medium of the London agency, and form the companies in the colony, than to attempt to carry them on by means of the so-called London management. It is certainly very humiliating to us as a nation, which has hitherto stood high in the estimation of the world for *bona fide* enterprises, honesty of purposes, and faithfully carrying out undertakings, that such a character is now all but lost—that it is now next to impossible to get together a few of the old honest stock of commercial men to form a board of directors of a public company, and carry it out strictly legitimately.

Almost all such projects are now laid hold of by stock gamblers and their agents, for the sole object of disposing of their worthless scrip to country folks, and then drain them afterwards to death to keep up offices, and provide posts for their friends and relatives, to the great injury of the well-being of the small capitalist, and to the disgrace of the nation.—*Thurloe-square, Nov.* 27. EVAN HOPKINS.

OUR GLOBE, AND THE GEOLOGISTS.

SIR,—"A Young Searcher in Geology" will find the question he refers to fully explained in Hopkins's *Geology and Magnetism*, page 112, chap. 19.

Volcanoes may be considered in reference to the earth as eruptions are looked upon in connection with all active bodies, be they mineral, vegetable, or animal. There are about four kinds of terrestrial pimples called volcanoes—viz., watery, muddy, gaseous, and inflammatory. To the latter kind your correspondent appears to allude. These are the most rare, there being scarcely ten volcanoes discharging melted lava in the whole world, and even these are only in a state of activity during subterranean storms, and are often extinguished by the sea pouring into them.

Electro-chemical action, under certain conditions, produces intense heat; and when we consider the substances in solution constituting the crust of our globe, and the existence of subterranean electric currents, we are at once able to account for those comparatively local phenomena which so much puzzle geologists, and have given rise to the doctrine of fluid incandescent matter. How your correspondent can account for combustion without oxygen, is to me a mystery. His assertion that the lower we descend in the earth the higher the temperature becomes, is incorrect; for the deep-seas that have been penetrated by man, and which far exceed in depth any shaft that has been sunk in the land, prove the contrary. The surface of the ocean is warmer than the lowest depths of the sea: and when we turn to the facts that have been observed in descending shafts, &c., we must bear in mind that chemical action is capable of causing great heat. But such facts are exceedingly local, for we find the temperature changing from high to low, and *vice versa*, in descending the same shaft. We find the levels in the coal seams frequently hotter than the workings in the limestone underneath.

Your correspondent, when he considers the whole number of volcanoes put together, and compares such with the size of the globe, cannot but be surprised at the apparent tranquillity and serenity which must exist in the melted lava supposed to exist within. How long would an egg-shell exist if the liquid within were composed of incandescent matter?—*Islington, Nov.* 26. A STUDENT.

SPECIAL RULES FOR SOUTH STAFFORDSHIRE DISTRICT. (REVISED.)

SIR,—The committee which has been appointed by a public meeting of ground bailiffs and mine agents, for the express purpose of revising the special rules which have been adopted for the guidance of those who have the management of coal mines in the South Staffordshire district, have given to the public the results of their cautions wisdom and sound practical deliberations. These results are stated with modesty, and a full appreciation of the opinions of others whose experience in mining operations may be equal to their own. They have not been slow to learn the lessons of experience from every accessible source. The wisdom derived from the long experience of the Government inspectors and mine agents of repute in other districts has been duly considered, and they have not pressed the revised rules upon the attention of the mining public as being immaculate, "but rather as a first draught, to be afterwards matured." These modest declarations—the sure concomitants of power to deal effectively with the difficulties which the discussion of the questions has revealed—deserve, and will obtain, the approval of every honest, thinking collier.

COALOWNERS.—It is humiliating to contemplate that the only responsibility which the committee can attach to this class is to supply the materials for working the coal pits in safety, and to receive from time to time the reports from the various agents respecting the due observance of the general and special rules, a copy of which must be supplied to every workman on the colliery. The enunciation of this responsibility ought to make every coalowner blush: and really I cannot see, in the present state of things, how to advise the ground bailiffs and mine agents of South Staffordshire to increase this responsibility with advantage to the colliers. I am unable to see the use of the second rule, as applied to the coalowner: does not the responsibility of using the single-link chain belong to the chief engineer? If he think it unsafe to be used, then the coalowner must submit.

MINE AGENT.—This officer is justly charged with the responsibility of planning the underground workings, ventilation of the mine, and appointment of butties; in fact, the whole management of the pit, so far as the provision of proper persons to carry out his plans and conduct the works are concerned, rests on the shoulders of the mine agent. And it is necessary that such an officer should have every assistance which science and practical experience can suggest and impart. His experience should extend also to every department of colliery labour, and he should enjoy the advantage of as much pure and mixed science as is applicable to an efficient discharge of his important duties, and a keen insight into the characters of men, to enable him to select those best adapted for the purpose of executing his plans. The "butty" is a little king in a coal mine: he says to that man, go, and he goeth, and to that man, come, and he cometh. His influence over the colliers is unbounded; he finds them employment, and pays them their wages. Therefore, it is highly necessary that the appointment of such an individual should be the result of great deliberation and personal knowledge on the part of the coal agent.

BUTTY.—In accordance with the rules, the butty is to comply implicitly with the instructions given to him by the mine agent, still there is left for him ample scope for individual responsibility and independent action in the successful working of a coal mine. For instance, the butty has the full control of every man working in the pit and on the bank, and cannot on any pretence whatever be absent, without acquainting the mine agent of the circumstance. This is a wholesome check, and I hope it will be insisted upon. The butty has to examine the shaft, side walls, insett, sump, provide means for securing the roof and air courses, attend to the amount of ventilation, and to the safety-lamps; he has, in fact, to be responsible for the proper working condition of the pit in every point affecting the safety of the workmen. There can be but one opinion of this being indeed a responsible office, and no person should be allowed to attempt the discharge of its duties without a full appreciation and sensible recognition of the vital importance which is attached to their faithful execution.

OVERMAN, OR DOGGY.—The duties of a doggy are of a still more serious nature: he has to take a safety-lamp, and descend every morning the coal pit alone, go through the whole of the banks, gateways, and stalls, put up danger signals where such are necessary, personally warn the men and boys from going to the places where the danger signals are, cover the sump, and then if the pit is in a safe condition, as reported by this important official, the men and boys are allowed to descend and commence operations.

Such are the views of the mine agents and ground bailiffs of South Staffordshire with respect to the duties of butties and doggies, and there can be no doubt that the position of these men is such as to render them the most eligible to carry out successfully those momentous regulations which the mine agents have imposed upon them, and which, if properly and faithfully put into practice, will be amongst the best means of diminishing those frightful accidents that hurry so many useful lives into that undiscovered country from whose bourn no traveller returns.

But now there remains one question to ask, and it presses itself with importunate pertinacity upon the attention of all sensible men, who will not, must not, remain satisfied without a favourable response. The question is, are these men—the butties and doggies—nearly of equal rank as respects position and attainments, qualified by education to take the responsibilities of such weighty duties, with honour to themselves, safety to the workmen, and satisfaction to the public? This question, it appears, has been decided by the mine agents, or they could not, in council assembled, recommend these men as fit and proper persons to have the management of such regulations as those which appertain to the safety of men's lives. I would ask respectfully, if the mine agents have reasoned this matter well over? if they have given that attention to it which its importance demands as an element in the successful development of their rules? It is true that sprags and props are employed by the collier to support coals and roof in the banks, but are they used by him without considering the nature of the sprag and the coal which it has to support, before he trusts his life in a perilous position? Does he not ask himself a few questions—whether the sprag is strong enough to support the weight which is likely to bear against it? And if the sprag be strong enough in his opinion, does he not enquire whether the floor on which it abuts be sufficiently strong to prevent the foot of it from slipping away? If these questions, respecting the means to the end, be asked by the collier, and I know they are, then the mine agents will do wisely to follow the example, and quietly ask themselves, It is true that the butty and doggy are in the best practical position to carry out the regulations which we have assigned to them; but are they fitted by education, habits, and self-interest, for the discharge of such important duties? In the consideration of this question men may, and I have no doubt they will, arrive at different conclusions; but I think all will agree that the intelligence and education of these men are by no means in excess; and a little more intelligence will not render them less practical and efficient instruments in the hands of the mine agent in developing the resources of the coal mines, at the least possible expenditure of life and treasure.

Why not institute an educational test, to be accomplished by self-moved industry, for a workman to be eligible for the situation of a butty or doggy? I see no practical objection of any moment against such a course, as the position would be competed for in earnestness, as giving to a wise thinking man an opportunity of effecting much good amongst the men. The various rules for the guidance of the engine tenders, banksmen, hookers-on, and colliers, need no comment of mine; they are such as experience would suggest, and I trust the men will endeavour to carry them into practical effect, as the best means of protecting their lives, and increasing their comforts.

Nov. 22. COAL MINER.

NEW FORT BOWEN APOLOGISTS.

SIR,—It is really curious how men become infatuated, so that when truth is shown them they are, or pre end to be, more annoyed than when deceived by false statements. The Fort Bowen New Company published a report in your Journal, upon which I made certain comments. Now if my remarks were in any manner incorrect, the public were capable of judging for themselves. The fact is, these strictures were too true to be palatable to some parties. I have always stated that the property was valuable, but that the great difficulties to be encountered were the climate and the want of efficient labour.

In the last three years there has been there an enormous mortality among Europeans, which, when published, will startle the most reckless adventurer. Only last July, Capt. Paull and Mr. Tournier were both in the enjoyment of the best of health, at my house, on the same evening. One is dead, the other has been near dying from an attack of putrid fever, and after having been confined to his room for two months, is now so weak as not to be able to walk: his health for the rest of his days will be so much impaired as to destroy all enjoyment.

Read Mr. Eddy's account in the Journal of the mortality under his administration. Next came Mr. Day, whose health was so much impaired that for whole months he could not leave his room. Next, Mr. Ram, who for above one year after his return to England was subject to attacks of intermittent fever.

Mr. Tregoning was obliged to leave the mines for six weeks, with the remaining miners who had not died, in order to recruit their shattered health. Lastly, Captain Paull, who was the most intelligent of any who had the management of this company's affairs at the mine. I had formed a strong attachment for this young man. His death, coupled with other circumstances which I will hereafter mention, have determined me not to leave England in exchange for a country which is a grave for Europeans. The casualties by drowning have in this year alone amounted to no less than seven persons. The trip from Colon to Escrebanos in a canoe is more perilous than a voyage round the world in a vessel of a few hundred tons. It may be asked why I desired to visit such a country a second time? In reply, I must state that having been exposed for the last twenty years to every variety of climate; and being a medical man, I avoid the immediate causes of disease, and employ, in time, appropriate remedial agents. I am fully convinced that during my last visit to the Fort Bowen Mine, had it not been for the accidental discovery of a bottle of croton oil, my life would have been sacrificed. In corroboration of all I state, your readers have only to refer to the back numbers of the Journal.

The correspondent who writes anonymously in your last Journal is unworthy of a reply, more particularly as what he refers to is of a strictly private nature, with which the public has no concern, inasmuch as the enterprise was confined to Mr. Tournier and myself, and we alone will be the losers.

I must, however, in self-justification, state, I sent a legal power of attorney to Col. Totten, superintendent of the Panama Railroad, to regulate my affairs on the isthmus; until I hear from that gentleman, I will not enter into particulars, as the whole matter will come before a legal tribunal in this country. In conclusion—1. I never made any arrangements to pay the freight in advance.—2. Mr. Tournier was robbed of all his money at Colon, of which fact he wrote to Capt. Charretie, one of the directors of the Fort Bowen Company.—3. Mr. Cowan, the Fort Bowen Company's agent at Colon, has, I believe, been the cause of all the difficulties attending the Belen Mine, he having entered a process at the Provincial Court at Nata, contesting the Governor's grant to me, which was officially published in the *Gazette* of Panama, on Dec. 15 last.—4. I never received a bill of lading for the goods, nor has Mr. Tournier.

My affairs now in England and France are far too important to be abandoned for the speculation of working a gold mine; and my sole object in desiring to work the Belen was, the conviction that the decision of the Governor of Panama was final, and that I could have, in connection with Mr. Tournier and Mr. Paull's valuable assistance, worked the mine to advantage. Since then my affairs in England have assumed an importance which demand my immediate personal attention, and will be more lucrative than the doubtful enterprise of working a gold mine on the inhospitable Isthmus of Panama. Had it not been my intention to have personally superintended the erection of the machinery and working of the mine, I never would have made any outlay; now, however, it is better that I sacrificed everything, sooner than neglect the important commercial undertakings with which I am connected.

That the engineer should have received 50*l.* is news, but understood by me, for his salary was paid in advance, nor could he claim anything under his contract; I am only surprised the sum was not 100*l.* more: but these transactions will avail nothing. As I said before, Mr. Tournier wrote to me that he was robbed of all the money, which was to have paid the freight.

The conspiracy, which has been effected to defraud me of my property on the isthmus, may be a triumph to certain persons; but what will be their position in the estimation of every honest man, when all the facts come to be exposed in a court of justice? On my hearing of the death of poor Capt. Paull, I immediately wrote to his brother in Plymouth, that my prospects in the isthmus were irretrievably blighted, as I knew Mr. Tournier was too old, now over 73, to conduct the affairs himself, which subsequent facts have abundantly proved; for he has, from disease, become an easy prey to that class of unprincipled persons who infest this country—the escaped convicts from Jamaica and the other West India Islands. Let him who answers this not be ashamed to affix his name. ROBERT COLLYER, M.D.

3, *Park-road, Regent's Park, Nov.* 24.

MINING IN AMERICA.—CARROL COUNTY, VIRGINIA.

SIR,—In your Supplement of Saturday last there is an interesting communication on "Mining in America," by Mr. C. S. Richardson. It is at all times pleasing to be informed of the great mineral riches contained in the lands of our cousins in the West, and the more especially when—as in Mr. Richardson's communication—we are informed of the drawbacks as well as the mineral richness which attend on mining in America; and for your information, Sir, I enclose herewith a map of the district of Carrol County which I have received from Virginia lately, together with a report of a geological survey of the mines noted by Mr. Richardson, from the pen of Professor M. W. Dickeson of Philadelphia. These I place at your service, for publication or otherwise,* as affording some useful details.

Now, Sir, the very great mineral riches of the United States are well known to those whose professional duties have, from time to time, brought them in contact (by examination) with the mineral districts of that land; in fact, it is difficult to overestimate the productive character of the mineral veins in some of the States, especially those of copper and iron. In my experience in that country I have admired in many instances the unequalled productive character of the mineral veins, and at the same time have deplored the natural situation of many of the veins, as being shut out from all communication, there being no roads by which the produce from the mines could in any way be made available. Such a circumstance in Carrol County Mr. Richardson very properly notices in his communication. You will permit me, Sir, to notice some other drawbacks to the investment of capital in "Mining in America." In the State of Virginia (noted by Mr. Richardson), no alien company either by themselves or their native trustees, can hold more than 3000 acres of land, by the law of the State. This appears to have been established as a matter of good policy, according to the State laws, to prevent aliens from acquiring property of sufficient extent so as to disturb the slave institutions, or in any way to take steps (by having large possessions) to upset the existing form, and converting it into a form which might lead to its being made a free state. Of course no alien ought in any way to interfere with State laws or institutions; but as prevention is better than cure, such laws are in existence—yet even such are detrimental to mining by aliens, as any limits to a particular acreage will be found in some cases to exclude them from obtaining necessary timber for mining or purposes of fuel, as well water-rights, roads, &c. Mining, as carried on in America, is in most cases a name, but not a reality. The operations are generally found so ill-planned, and carried on so miserably, as to be undeserving of the term "mining."

Another State named by Mr. Richardson for its mineral importance, that of Tennessee, also possesses some copper mines, which in popular language are mines "by courtesy only," as being situate in a district not readily approachable. Yet the mineral veins there are very important in themselves, and highly productive; but the want of necessary roads materially lessens the value and importance of these regions; and although much may be said in favour of the productive character of the veins, one cannot add a word about satisfactory dividends, for there have been none paid. Another check militating against the employment of foreign capital in "Mining in America," so far as the State of Tennessee is concerned, is the fact that although property may, under some circumstances, be held by a native trustee as and for an alien, yet the laws of the State do not permit the trustee to convey that property to a company whose shareholders and proprietors are aliens, that is, an alien company; but if so done or conveyed, the State at its pleasure can enter thereon and take possession thereof, for the commonweal of the State, confiscating the property from its alien proprietors. I need not add that the State authorities would never think of doing so until the alien company had paid the last dollar due for the property.

Arrangements are now on the *tapis* in Europe for bringing out some of the mines in the districts named in Mr. Richardson's very useful communication, the drawbacks named are, however, carefully concealed by the parties interested, yet they will be found of sufficient importance, when properly looked into, to deter all reasonable persons from risking their money in undertakings which, when formed into a public company, they may find themselves or their property "annexed," for the commonwealth of the State, *à la filibuster*. A number of scheming adventurers, English, Scotch, and Yankee, join to complete a scheme of this kind; in some instances, the sequel proves that after all their "smartness," the *Times* some morning announces the fact that they have "suspended payment," having been extensively engaged in "mining." The *Mining Journal* frequently offers good advice on such subjects; let it be well observed.—*London, Nov.* 25. ARGUS.

* We shall refer to these communications, if possible, in our next Journal.

THE NEW JOINT-STOCK ACT — ITS APPLICATION TO EXISTING COMPANIES.—We have frequently drawn attention to the immense advantages to be derived from the registration of every company under the Joint-Stock Companies Act, 1856; and, although many mining companies have resolved not to register, on the plea that no law can render the liability of the shareholder more unlimited than it is at present, when the mines they are working are not within the jurisdiction of the Stannaries, the truth of our assertion is not in the least impaired; and sooner or later the advisability of adopting our suggestions will become apparent, even to the shareholders who were most inclined to continue in their old and dangerous course. The Culchote Copper Mining Company have long been struggling, with a very inadequate capital, to properly develope their mines, and thus release themselves from the difficulties they have encountered; yet, from the stringency of their Deed of Settlement by which they were governed, and the apathy of the shareholders, they appear to have been foiled in every attempt to make the undertaking remunerative. Since the Joint-Stock Companies Act has become law the company has been registered at the suggestion of the directors, who had already advanced a large amount for carrying on the operations at the mines; almost the sole cause for such a step being that the Act contained provisions which enabled them to wind-up voluntarily, instead of incurring the expenses of winding-up in the Court of Chancery. It is true that some small expense is incurred in registering, and that the directors and secretaries have not nearly the opportunity of deceiving or defrauding the shareholders that they have in an unregistered company; but, by procrastination, it may be found that at the moment when it is advisable to wind-up the company there are no funds in hand even for the registration fees, and then, when too late, the directors find that they only are in a position to pay the debts, and consequently the whole burden falls upon them—a just return for their failing to avail themselves of an Act which offers so many advantages to the shareholders generally. The liabilities of the Culchote Company are comparatively trifling, and there is every reason to believe that the mines are well worthy of thorough development, provided an adequate capital be raised, and operations carried on with energy; and it would, therefore, appear that the only course that can be adopted is to wind-up the present company as proposed, although a new company for working the mines in a legitimate manner would have a fair prospect of success. By the adoption of the voluntary winding-up system the expenses will not amount to one-fourth the costs which would be incurred by obtaining the intervention of the Court of Chancery.

THE METAL TRADES.—A very useful Chart, prepared by Mr. Johnston, metal merchant, of Glasgow, is now ready: it contains, amongst other information of the greatest interest to all connected with the metal trades, an elaborate diagram, showing at one view the prices of the principal metals during the past 16 years, the Birmingham wire and metal guages and the modern Belgian zinc guage, the weight and thickness of lead piping of various diameters, &c., thus forming a valuable work of reference for the counting-house of the iron merchant or broker. Copies may be had at the office of the *Mining Journal*. Price: Mounted, on rollers, 21s.; on plain sheet, 15s.

NEW SILVERING SOLUTION.—Mr. B. F. Ren, of Lafayette, Alabama, has communicated to the *Scientific American* the following method of silvering and gilding metals:—Take 32 grains of lunar caustic (nitrate of silver), and dissolve it in 4 ozs., by measure, of rain water; add to this 128 grains of cyanuret of potash, shake for a few minutes, and it is ready for use. Apply this solution to the polished brass or copper, using a soft cloth, with prepared chalk. This is a simple and quick way of preparing the cyanuret of silver in solution. It is very poisonous, and should be labelled "poison." If there is a sore on the hand or on a finger, it should be protected before using this; otherwise there is danger. It can be applied to many purposes, and is useful in polishing spoons, forks, and candlesticks, and, indeed, anything made of silver, when it is necessary to clean them up. The process of gilding is easy enough, but the articles have to be cleaned and immersed. Dissolve gold filings, or in small pieces, in nitro-muriatic acid—made of one part of nitric acid, and two parts of muriatic acid—with a gentle heat, and a strong solution of cyanuret of potash in water, till the acid is neutralised, and an excess of the cyanuret solution added. It is better to throw in, also, a little carbonate of potash. The article to be gilded is put into this solution, and clamped with a strip of sheet zinc. The zinc is cut into a strip 4 or 5 inches long and ½ an inch wide, and the ends bent together so as to hold the article, which should occasionally be taken out and polished. The gold solution should be kept in a dark place.

SMOKE-BURNING.—With respect to smoke-burning, the best species of furnace for the accomplishment of this object, without the introduction of counteravailing evils, is one which Mr. Armstrong has designed for Woolwich Dockyard, on a nearly similar plan to several erected by him in the Arsenal. In this furnace the foremost length of bars slopes somewhat towards the mouth; whereas, the after lengths of bars slope in the contrary direction, or towards the bridge. At the ridge where the opposite slopes meet, there is a double bearing bar, which permits some air to enter the furnace in that situation. The coal in the foremost length of bars is maintained in rapid combustion, whereas the coal upon the after tier of bars is undergoing a slow distillation. In charging the furnace, the coal is thrown chiefly to the back end, so that the surface of the fuel slopes forward from the bridge towards the furnace mouth. This coal, being lighted on the top, becomes a kind of coal tore. The gas generated by the heat, in passing through the ignited stratum on the surface, is consumed; and, from time to time, the ignited embers, from which the gas has been expelled, are raked forward, and fresh coal is thrown in to maintain combustion. Very little smoke is evolved from this species of furnace; and it differs little from a common furnace, either in construction or efficiency.—*Modern Practice of Boiler Engineering.*

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TESTIMONIALS.

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GENTLEMEN,—We have been using almost exclusively, for the last three years, your Packing to our stuffing-boxes and steam and water-joints, previous to which time we tried all the sorts which came under our notice, but yours we consider decidedly the best and most economical. JOSHUA SCHOFIELD AND SONS.

Messrs. S. W. Silver and Co., 3 and 4, Bishopsgate-street, London.

King and Queen Ironworks, Rotherhithe, London, Nov. 11, 1854.

GENTLEMEN,—We have tried your Patent Packing for some time in our steam-engines, and also in steam-pipe joints, and find it efficient and economical, and to be much superior to the ordinary hemp packing. It is especially serviceable in the slide valves. HOWARD RAVENHILL AND CO.

Messrs. S. W. Silver and Co., 3 and 4, Bishopsgate-street, London.

Works, Deptford, Jan. 29, 1856.

I have pleasure in stating that the Packing of Messrs. S. W. Silver and Co. has been in use in the various parts of the engines on board the steam-ships of the company, and given every satisfaction.

J. BEARDMORE, Engineer, General Steam Navigation Company.

Copies of further testimonials forwarded on application to S. W. SILVER and Co., 3 and 4, Bishopsgate-street Within, opposite the London Tavern.

TREBURGETT CROWAN CONSOLIDATED COPPER MINING COMPANY (LIMITED BY ACT OF PARLIAMENT).

SITUATE IN THE PARISH OF CROWAN, THE BEST MINING DISTRICT IN CORNWALL.

Capital £50,000, in 5000 shares of £10 each.—Deposit £5 per share.

SECRETARY—Mr. William Evans.

OFFICES,—No. 9, AUSTINFRIARS, LONDON.

Applications are yet required for the 1500 shares unsold.

Prospectuses may be obtained at the offices of the company; or of the broker, PETER WATSON, Esq., 57, Threadneedle-street. WILLIAM EVANS, Sec.

FOX TOR ALVENNY TIN AND COPPER MINING COMPANY (LIMITED, under the Act of 1856).

Capital £50,000, in 5000 shares of £10 each. Deposit £5 per share.

£1 per share to be paid on application.

Applications for the 2500 shares unsold may be made in the printed form, and addressed to the offices of the company, 9, Austinfriars, where prospectuses can be obtained; or of PETER WATSON, Esq., 57, Threadneedle-street.

WILLIAM EVANS, Sec.

WREY CONSOLS TIN AND COPPER MINE, IN THE COUNTY OF DEVON.

To be conducted on the "Cost-book Principle," and divided into 2048 parts or shares (no free shares); a deposit of 5s. per share to be paid on allotment, towards defraying the expenses incurred in procuring the sett, &c.; a call of 2s. 6d. per share to be paid in one month after, and another call of 2s. 6d. per share to be paid in three months after allotment, which amount will be entirely appropriated for the purpose of prosecuting the mine.

This mining sett is situated on Shuttaford estate, in the parish of Holne, about two and a half miles from Buckfastleigh, in the county of Devon; and held under a letter of license from Sir Bourchier Palk Wrey, Bart., with conditions for a lease of 21 years, at 1-16th dues.

The extent of the sett is 500 fms. from east to west, and about 490 fms. from north to south; it is centrally situated in a mineralised district, and contains numerous lodes; among others, those of the Runnaford Coombe Tin Mine, which formerly made large returns of tin; being also in the immediate vicinity of the "Queen" and "King" of Dart; and the Wheal Emma Copper Mines (now returning large quantities of rich copper ore); those lodes are expected to be found passing through the sett; from the promising indications at surface, together with the stratum being a killas country, of the most congenial description, and being within one mile of granite, there can be no doubt that the lodes traversing this sett will prove very productive, in yielding important quantities of tin and copper ores.

There is a stream of water available within the limits of the sett, which can be applied for the purposes of stamping and crushing ores, and such other uses as may be required for the working of the mine.

The sett has been inspected by competent persons, who have pronounced it to be a valuable property, and considered it worthy of being fully developed.

This mine is to be conducted strictly on the Cost-book Principle; regular meetings will be held on the mine, or such other place, or places, as may appear more convenient to a majority of shareholders; and no liabilities will be incurred but such as are determined on at the meetings.

A large portion of the shares are already engaged, and as soon as the whole of the shares are allotted, a meeting of the adventurers will be convened, for the purpose of making such arrangements as may then be considered necessary for prosecuting the mine.

Application for shares can be made to Mr. WM. WILLIAMS, mining agent, Buckfastleigh, sole promoter, who has incurred a considerable outlay in obtaining the sett, &c.; to Mr. HENRY STENTIFORD, Ashburton, who will, if required, show the property, or sett, to any parties disposed to examine it; to Mr. WM. WILLIAMS, Tavistock; or to the purser, from whom prospectuses, and all particulars as to the holding of the mine, &c., may be obtained.

Not less than 10 shares will be issued to any individual until the whole of the shares, as above, are allotted. Purser and Sec., *pro tem.*,

Totnes, Nov. 3, 1856. MR. A. HILL, Mining Office, Totnes, Devon.

FORM OF APPLICATION FOR SHARES.

SIR,—I request you to allot me parts, or shares, in the Wrey Consols Mine, which number I hereby agree to accept, and to pay the deposit of 5s. per share, herewith enclosed; also the calls on same, in accordance with the prospectus.

I am, Sir, yours, &c.,.....

o Mr. A. Hill, Mining Office, Totnes, Devon.

DEVON WHEAL DUCHY.

This is in a piece of hitherto-neglected, but very promising, mining property, although formerly considered one of the richest in Devonshire for tin. The stratum is a beautiful clay-slate, forming a junction with the granite; it is the nearest mine to the granite hills of Dartmoor, in the parish of Whitchurch. It is situated to the east of Devon Burra Burra, Whitchurch Consols, and East and West Sortridge, all the lodes of which run through this sett. It has Huckworthy Bridge Mine and North Wheal Robert to the south; and the Great Wheal Friendship to the north, which has been yielding dividends for the last 50 years.

The ancient miners have done a great deal on the banks of the tin lodes.

There are two very promising lodes laid open, one a tin lode, sunk 4 fms., with good stones of tin, the other a very fine copper lode, 7 feet wide, composed of gossan, prian, and mundic, with good spots of copper, with every appearance to warrant a course of ore at no great depth, with several other tin and copper lodes not yet wrought upon.

There is a very important point in working this mine—that is, by the aid of water machinery, as all the water which goes to North Robert, Sortridge Consols, and Great Sortridge, run all the length of the sett, which is nearly two miles long and more than one mile wide. All practical miners acquainted with this piece of mining property, come to the conclusion that it is an excellent adventure.

Any mining capitalist who would like to engage in such a promising piece of mining property, may obtain all necessary information by a letter directed to "R. T.," Moor's Shop, Whitchurch, Devon.

There is another important feature connected with this sett, and that is the immense and highly-metalliferous cross-course which passes through the Wheal Friendship and Devon Burra Burra Mines, which takes its bearing to the west of this sett. There has been but one mine tried by this cross-course, which is between the granite and killas, and that is Wheal Friendship, which has been very successful; and there is not the least doubt, if tried on east and west lodes, by this cross-course, they will make large deposits.

ELECTRO-CHEMICAL REDUCTION AND SEPARATION OF METALS FROM THEIR ORES.

By Her Majesty's Royal Letters Patent.

PATENTEES—Matt. French Wagstaffe, Esq., M.R.C.S., Walcot-place West, Lambeth; John William Perkins, Esq., F.C.S., Poplar-terrace, Poplar.

Licenses can be obtained for the use and adoption of the process on application to the patentees, at No. 2, Poplar-terrace, Poplar; where demonstrations on a large scale may be witnessed, and where mine owners and others may send ore for treatment. Analyses and assays of small samples will be made at a nominal charge.

London, Oct. 17, 1856.

SLATE.—The BANGOR ROYAL SLATE COMPANY have now ON HAND a large assortment of ROOFING SLATES, BLUE and GREEN, of the usual sizes, which they are prepared to SUPPLY on the usual terms, for shipment from their depôt at Bangor, or to transmit by railway; also, SLABS of all sizes.

Orders to be addressed to Mr. EDWARDS, manager, Royal Slate Quarries, Bangor.

SLATE SLABS AND ROOFING SLATES.—The PROPRIETORS of the NEW MACHNO SLATE and SLAB COMPANY (LIMITED) have, at great cost, made arrangements to convey their produce from their quarries near Ffestiniog to Conway, to obtain the great advantage of access to the railway, giving them the facility of executing orders without the slightest delay. They trust that making Conway their shipping port will not cause them to be confounded with those hitherto known as the CONWAY SLATES, as the MACHNO SLATES are ENTIRELY FREE from PYRITES, or any metallic substance liable to OXIDATION; and, from having been tested in Wales for at least half-a-century, are found to attain a degree of hardness, by exposure to the atmosphere, unknown in any other vein. The MACHNO SLABS are too well known to need comment, but the annexed valuable testimonial from Mr. Magnus, and also a strong chemical test to which they have been subjected, will better explain their quality:—

Pimlico Slate Works, Upper Belgrave-place, London, April 7, 1855.—GENTLEMEN: I very readily offer my testimony to the excellence of your slabs raised at the Machno Quarries. I prefer them to all others obtained in North Wales, with one exception, and that is much of the same quality as the Machno. The slabs can be obtained of large sizes, and of every requisite thickness. They are homogeneous in texture, strong, of good colour, free from spots and other impurities, pleasant to the tool of the mason, easily planed and moulded, and will bear exposure to a much higher degree of heat than slabs from any of the Carnarvonshire quarries.

Signed, G. E. MAGNUS.

To the Proprietors of the Machno Slate and Slab Quarries.

Liverpool, Oct. 18, 1855.—DEAR SIR: The experiments which I have tried on the specimen of slate, in reference to its capability of resistance to acids, enable me to pronounce it in every way capable of retaining boiling vinegar, without injury either to its own substance, or to the contained vinegar. A piece of the slate, weighing 95 grs., was exposed for 26 hours to the action of cold strong nitric acid; it was then boiled in the same acid for 20 minutes, and when washed, dried, and weighed, was found not to have lost perceptibly in weight. This I consider the most conclusive experiment.

Signed, GEO. C. HUSON.

Wm. Orme Carter, Esq., Machno Slate and Slab Company.

All communications must be addressed to the resident director, Mr. T. H. WHEELER, Conway, North Wales.

PATENT OFFICE, No. 23, PARLIAMENT STREET, WESTMINSTER.—FRANCIS WISE, CONSULTING ENGINEER, TRANSACTS ALL BUSINESS relative to the PROCURATION or DISPOSAL of BRITISH and FOREIGN PATENTS, and REGISTRATIONS of DESIGNS. Specifications drawn or revised. Working and finished drawings prepared. Inventors advised and assisted in arranging their improvements in practical form.

NEW PATENT ACT, 1852.—Mr. CAMPIN, having advocated Patent Law Reform before the Government and Legislature, and in the pages of the *Mining Journal*, &c., is now READY to ADVISE and ASSIST INVENTORS in OBTAINING PATENTS, &c., under the NEW ACT.

The Circular of Information, gratis, on application to the Patent Office and Designs' Registry, 156, Strand.

THE MECHANICS' MAGAZINE (published every Saturday, price 3d., stamped 4d., and in monthly parts) contains, in addition to a mass of interesting matter on scientific subjects, the SUBSTANCE of EVERY PATENTED INVENTION, together with all other current information concerning patents.

Messrs. ROBERTSON, BROOMAN, and Co. (Editors of the *Mechanics' Magazine*, established in 1823) UNDERTAKE the PROCURATION OF PATENTS for the United Kingdom and all Foreign Countries, and the transaction generally of all business relating to patents and the registration of designs.

Printed instructions supplied gratis on application.

Costs of provisional protection, £10 10s.

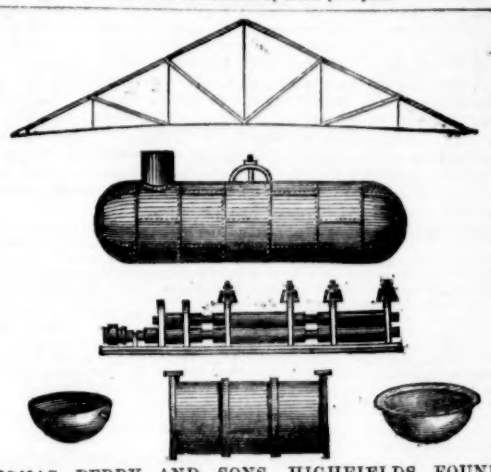
Mechanics' Magazine and Patent Office, 166, Fleet-street, London.

TO MARINE ENGINEERS, SCREW SHIP COMPANIES, AND MACHINISTS GENERALLY.

THE NEW PATENT MULTIPLE ROTATIVE GEARING.—This justly admired invention contrasts with the ordinary toothed gearing, for which it is proposed as a substitute, and possesses the pre-eminent advantages of COMPACTNESS, STRENGTH, DURABILITY, FREEDOM FROM NOISE and BACKLASH, UNIFORMITY and SMOOTHNESS of ACTION, REDUCED FRICTION, FACILITY for LUBRICATION and REPAIR, and virtually WITHOUT RISK of ACCIDENT, advantages unequalled in any other arrangement of gearing. It is proposed for all purposes where a change of speed is required, and is peculiarly applicable for screw propulsion.

The proprietors of the patent are prepared to GRANT DISTRICT and OTHER LICENSES for the manufacture of this gearing, or to ENTER INTO CONTRACTS for the adaptation of the invention to screw steam-vessels, or other machinery, upon application to their agent, No. 3, Hanover Chambers, Buckingham-street, Adelphi, where any further particulars may be obtained, and models and testimonials inspected.

The invention was honourably mentioned by the International Jury at the French Exhibition of 1855; and has been favourably noticed in the *Artizan* of June and July, 1855, and the *Mining Journal* of 8th December, 1855. Manufacturers treated with on the most liberal terms. Communications by letter post paid.



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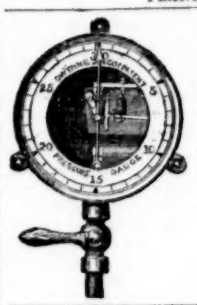

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PRICES.—Divisions on enamel dials indicating to 12, 20, 30, 60, or 80 lbs. pressure on the square inch, 55s. each; to 140 lbs. ditto, 60s. each; to 200 and 300 lbs. ditto, 65s. each. Vacuum Gauges, 55s. each. Any other divisions on dial can be made to order.

EVERY INSTRUMENT WARRANTED.

Further particulars on application to GWYNNE and Co., engineers, Essex Wharf, Strand, London.

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The attention of parties who employ

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Is respectfully requested to the superiority of those annexed, over those hitherto in use.

IMPROVED RATCHET JACK.

HALEY'S PATENT LIFTING JACK.

COALS FOR GAS AND COKE, of very superior quality, yielding 10,000 ft. of gas per ton, and producing COKE peculiarly adapted for locomotives, foundries, and smiths, MAY BE HAD in any quantity, direct from the collieries, by applying to THE BRITHDIR COLLIERY AND COKE Co., Newport, Monmouthshire.

Works published at the MINING JOURNAL *office, 26, Fleet-street, London.*

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